

DEVICE FOR TYING SHOELACE

Technical Field

The present invention relates to shoelace tying devices, and more particularly to a shoelace tying device which is coupled to a shoelace so as to firmly maintain a taut tied state of the shoelace.

Background Art

Generally, most widely used shoes, more particularly, sports shoes, are designed to enable a wearer to tighten the shoe to conform closely with the shape of the foot of the wearer by adjusting a tightening degree of a shoelace, which is threaded through eyelets punched through a shoe shell.

In order to secure such a shoelace-type shoe onto the foot of the wearer, first, the shoelace threaded through the eyelets is pulled tautly by the wearer so as to cause the shoe to tighten around the foot of the wearer, and then both free ends of the shoelace are tied into a bow-shaped knot.

However, the shoelace-type shoe has several drawbacks in that it is troublesome in use since the wearer has to tie or untie the shoelace whenever putting on or taking off the shoes, and the shoelace will often become inadvertently loosened and untied when walking.

As the prior art for solving such an inconvenience occurring in relation to the tying of a shoelace on the above described shoelace-type shoe, Korean Patent Registration No. 171552 (March 15, 2000), Korean Patent Laid-Open No. 2001-0008137 (February 2, 2001), etc. disclose shoelace tying devices.

The disclosed conventional shoelace tying devices, however, have several problems in that a shoelace cannot be easily threaded through the devices, and, even after being tightened, the tension in the shoelace is gradually released when walking which will cause the shoe to loosen on the foot of the wearer.

Disclosure of Invention

Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide a shoelace tying device which can be easily coupled to a shoelace, and enables the shoelace to be easily and rapidly tied and untied when putting on and taking off one's shoes.

It is another object of the present invention to provide a shoelace tying device which can

prevent a shoelace from becoming inadvertently loosened and untied.

It is yet another object of the present invention to provide a shoelace tying device which enables both hanging ends of the shoelace, which remain after tying, to be smartly knotted.

In accordance with the present invention, the above and other objects can be accomplished by the provision of a shoelace tying device comprising: a housing; a pair of lace passages, into which both free ends of the shoelace are threaded to penetrate therethrough, respectively; a pair of shuttles, which are vertically reciprocable so as to widen or narrow a width of the lace passages, respectively, when the shoelace, penetrating through the lace passages, is pulled to tighten a shoe, the shuttles being moved to widen the width of the lace passages, respectively, thereby securing free movement of the shoelace, whereas, when the shoelace is untied to loosen the shoe, the shuttles being moved to narrow the width of the lace passages, respectively, thereby restricting the movement of the shoelace; a pair of elastic members adapted to apply elasticity to the shuttles, respectively, for allowing the shuttles to move so as to narrow the width of the respective lace passages; and a release button adapted to cause the shuttles to move so as to widen the width of the lace passages as it is manually pushed.

Preferably, a pair of inclined protrusions may be obliquely arranged adjacent to the shuttles inside a space defined between an upper wall and a lower wall of the housing, respectively, spaces defined between the upper and lower walls around the respective inclined protrusions may define the lace passages, respectively, and the inclined protrusions may be positioned so that they are upwardly close to or downwardly apart from a vertical movement path of the shuttles, thereby causing the lace passages to be narrowed or widen according to vertical movements of the shuttles.

Preferably, the shuttles may be toothed wheels, and may be reciprocatably fitted in shuttle slots formed at upper and lower sides of the housing.

Preferably, the elastic members may be torsion springs incorporated in the housing.

Preferably, the shoelace tying device may further comprise a shoelace holder incorporated in the housing, into which both hanging ends of the shoelace are fitted and tied.

Preferably, the shoelace holder may include a pair of connecting rods connected at their one-side ends to the housing, a holder body connected to the other ends of the connecting rods and having a plurality of holes for allowing the shoelace to be threaded therethrough into a bow-shaped knot, one surface of the holder body being opened to allow the shoelace to approach the holes, and a cap for covering the opened surface of the holder body.

Brief Description of Drawings

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

5 FIG. 1 is a perspective view illustrating a shoelace tying device in accordance with a first embodiment of the present invention;

 FIG. 2 is a schematic plan view illustrating the shoelace tying device shown in FIG. 1, shown in a state wherein covers are omitted;

 FIG. 3 is an exemplary view illustrating a state wherein the shoelace tying device shown
10 in FIG. 1 is mounted to a shoe;

 FIGs. 4A to 4D are plan views illustrating sequential operating steps of the shoelace tying device shown in FIG. 1;

 FIG. 5 is a perspective view illustrating a shoelace tying device in accordance with a second embodiment of the present invention;

15 FIG. 6 is a schematic plan view illustrating the shoelace tying device shown in FIG. 5, shown in a state wherein covers are omitted;

 FIG. 7 is an exemplary view illustrating a state wherein the shoelace tying device shown in FIG. 5 is mounted to a shoe; and

 FIGs. 8A to 8D are plan views illustrating sequential operating steps of the shoelace tying
20 device shown in FIG. 5.

Best Mode for Carrying Out the Invention

Reference will now be made in greater detail to preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same
25 reference numerals will be used throughout the drawings and the description to refer to the same or like parts. The following embodiments are only intended to exemplarily explain the shoelace tying device in accordance with the present invention, and are not intended to limit the scope of the present invention.

First Embodiment

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Now, a shoelace tying device in accordance with a first embodiment of the present invention will be explained with reference to FIGs. 1 to 4D.

As shown in the aforesaid drawings, the shoelace tying device, which is designated as reference numeral 1, is a device for tightly tying both ends of a shoelace 2 so as not to be inadvertently loosened and untied, and essentially comprises a pair of left and right lace passages 20, a pair of left and right shuttles 30, a pair of left and right elastic members 40, and a release button 50. All these enumerated components are incorporated in a housing 10 of the shoelace tying device 1.

The shoelace tying device 1 is designed to tie both the ends of the shoelace 2 in the same manner as each other. Thus, the shoelace tying device 1 is structured so that its left and right sides are symmetrical to each other. Hereinafter, accordingly, only one side of the symmetric structure will be explained as occasion demands.

The housing 10 is a casing member for incorporating various components of the shoelace tying device 1 therein. Although the housing 10 has an approximately rectangular sectional shape in the embodiment shown in FIGs. 1 to 4D, it should be noted that the shape of the housing 10 is not limited to any specific shape so long as it can incorporate other components of the device 1 to conform to their purposes. For example, the housing 10 may be formed into an elliptical shape as shown in FIG. 5, and, furthermore, may be formed into other various characteristic shapes capable of attracting interest of children.

The lace passages 20 are passages for allowing the shoelace 2 to penetrate therealong inside the housing 10. In order to define such lace passages 20 inside the housing 10, a pair of inclined protrusions 13 are symmetrically incorporated in a space defined between an upper wall 11 and a lower wall 12 of the housing 10 so that they are spaced apart from the upper and lower walls 11 and 12 by constant distances and are obliquely oriented relative to a vertical movement path of the respective shuttles 30. Thereby, either space between the upper and lower walls 11 and 12 around the respective inclined protrusions 13 defines each lace passage 20.

The lace passage 20 is divided into three passage sections 20A, 20B, and 20C. In this case, the shoelace 2 first enters the passage section 20A defined between the upper wall 11 and the inclined protrusion 13, then goes round the passage section 20B defined between the inclined protrusion 13 and the shuttle 30, and finally comes out of the passage section 20C defined between the inclined protrusion 13 and the lower wall 12. That is, the shoelace 2 is threaded in the housing 10 while moving one turn around the inclined protrusion 13. Here, terms "the upper wall" and "the lower wall" of the housing 10 are classified simply in consideration of upper and lower positions of the drawings.

The shuttles 30 are members for tightening the shoelace 2 so as not to be inadvertently loosened and untied, as well as for enabling the shoelace 2 to be simply and easily untied when taking off shoes.

More particularly, when the shoelace 2 is pulled so as to cause a shoe 3 to tighten in a direction of the arrows shown in FIG. 4A, the shuttles 30 are moved by the movement of the shoelace 2 so as to widen a width of the passage sections 20B in a direction of the arrows shown in FIG. 4A, thereby being adapted not to restrict the movement of the shoelace 2. In this way, the shoelace 2 is maintained in a freely movable state.

On the contrary, when the shoelace 2 is pulled so as to cause the shoe 3 to be loosened in a direction of the arrows shown in FIG. 4B, by virtue of both a force applied to the shoelace 2 and the elasticity of the elastic members 40, the shuttles 30 are moved so as to narrow the width of the passage sections 20B in a direction of the arrows shown in FIG. 4B, thereby being adapted to restrict the movement of the shoelace 2. As a result, the shoelace 2 is securely tightened so as not to be inadvertently loosened and untied.

Consequently, in a non-pushed natural state of the release button 50, according to interaction between the lace passages 20, shuttles 30, and elastic members 40, the shoelace 2 is freely movable in a direction of tightening the shoe 3, but is limited in its movement in a direction of loosening the shoelace 3.

In the present embodiment, as the shuttles 30 are used toothed wheels. The toothed wheels 30 are installed so as to reciprocate in a vertical direction of the housing 10. That is, the toothed wheels 30 are vertically reciprocable in a state wherein they are fitted in vertically aligned shuttle slots 14 and 71 of the housing 10. Here, the shuttle slots 14 and 71 define a movement course of the shuttles 30. Alternatively, instead of the toothed wheels, other members, such as rollers, having a high-frictional surface may be used as the shuttles 30.

As can be seen from the drawings, each of the inclined protrusions 13 is obliquely arranged so that it is upwardly close to or downwardly apart from the shuttle slots 14 and 71. In the present embodiment, the shuttle slots 14 are formed at a lower surface of the housing 10, and the other shuttle slots 71 are formed at an inner cover 70, which will be explained hereinafter.

According to the above described vertical reciprocating movements of the shuttles 30, when the shuttles 30 are moved upwardly, the lace passage sections 20B are narrowed, thereby restricting the movement of the shoelace 2, and, when the shuttles 30 are moved downwardly, the lace passage sections 20B are widen, thereby securing free movement of the shoelace 2.

The elastic members 40 are members for providing an elastic force required to move the shuttles 30 upwardly so as to narrow the lace passage sections 20B and thus restrict the shoelace 2. In other words, if no external force is applied thereto, the shuttles 30 are maintained in such an upwardly moved position by receiving the elastic force of the elastic members 40, respectively. If
5 an external force, overcoming the elastic force of the elastic members 40, is applied, the shuttles 30 are moved downwardly so as to widen the lace passage sections 20B and thus release the restriction of the shoelace 2. However, even in this case, the shuttles 30 are adapted to be immediately returned to their original upward positions as soon as the external force is released.

The elastic members 40 can be freely selected from among various kinds of members so
10 long as they can provide an elastic force required to move the shuttles 30 so as to narrow the lace passage sections 20B, respectively. In the embodiment shown in FIGs. 1 to 4D, especially, each of the elastic members, which is specifically designated as reference numeral 40A, takes the form of an elastic plate-shaped member integrally protruding from the housing 10 below an associated one of the shuttles 30. The elasticity of the elastic plate-shaped member 40A is the elasticity of a
15 material of the housing 10 itself, and the housing 10, for example, is made of plastic synthetic resins.

The release button 50 is a button for allowing the tightened shoelace 2 to be loosened. In the shown embodiment, the release button, which is specifically designated as reference numeral 50A, is fitted at the center thereof around one end of a partition 15. Here, the partition 15 forms
20 the center of a left and right symmetrical structure of the housing 10.

The release button 50A has two operating portions 51 for pressing a pair of the left and right shuttles 30, respectively, and a button portion 52. In a state free from external force, since the shuttles 30 are maintained in the upwardly moved position by the elastic plate-shaped members 40A, the release button 50A, which comes into contact at its operating portions 51 with both the
25 shuttles 30, is moved upwardly, thereby causing the button portion 52 to protrude upwardly out of the housing 10. In this state, as the wearer pushes the release button 50A, the operating portions 51 of the release button 50A act to correspondingly push the shuttles 30 downwardly and thus cause the lace passage sections 20B to widen. In this way, the shoelace 2 is released from its restricted state, so as to be loosened if necessary.

30 As stated above, with the shoelace tying device 1 in accordance with the present invention, the shoelace 2 can be tightened so as not to be inadvertently loosened by being pulled by the wearer as desired. Furthermore, the shoelace 2 can be continuously maintained in the

tightened state unless the wearer pushes the release button 50A.

Meanwhile, both free hanging ends of the tightened shoelace 2 cause inconvenience when walking since they may be stepped on by the wearer. Therefore, the shoelace tying device 1 of the present invention is preferably formed with a pair of left and right shoelace holders 60 for grasping both hanging ends of the shoelace 2.

Each shoelace holder shown in FIGs.1 to 4D, which is specifically designated as reference numeral 60A, has a holder post 61 formed at either corner of a lower edge of the housing 10. Between the holder post 61 and the lower wall 12 is defined a narrow gap 62 for allowing the shoelace 2 to be fixedly fitted therein. With such a shoelace holder 60A, the shoelace 2 is securely captured in the gap 62, so as to be smartly tied and fixed.

Preferably, the shoelace tying device 1 of the present invention comprises the inner cover 70, and an outer cover 80.

In the shown embodiment, the inner cover 70 is formed with a pair of the above described shuttle slots 71. Therefore, in a state wherein the housing 10 is covered with the inner cover 70, both the shuttles 30 are fitted in the shuttle slots 71 in a vertically movable manner, respectively. One end of the inner cover 70 is hingedly connected to one end of the housing 10, and the other end thereof is adapted to be elastically locked in a locking groove 16 formed at the other end of the housing 10 in its covered state.

In addition, the outer cover 80 is formed with a pair of inclined protrusion slots 81 having a shape and size suitable for the fitting of the respective inclined protrusions 13. As the housing 10 is covered with the inner cover 70, and then is again covered with the outer cover 80, the inclined protrusions 13 are tightly fitted in the inclined protrusion slots 81, respectively, thereby achieving firm locking of the outer cover 80.

Now, the operation of the shoelace tying device 1 in accordance with the present embodiment will be explained with reference to FIGs. 4A to 4D.

First, as shown in FIG. 4A, as the shoelace 2 is threaded in the lace passages 20, and is tightened by being pulled in the direction of the arrows, the shuttles 30, which are previously moved upwardly by the elasticity of the elastic plate-shaped members 40A, are forced to move downwardly by the movement of the shoelace 2. In this way, the shoelace 2 is maintained in a freely movable state so as to be pulled by the wearer as desired.

After that, when a pulling force applied to the shoelace 2 is removed, the shoelace 2 is forced to be loosened by some extent in the direction of the arrows shown in FIG. 4B due to the

compression of a foot. This results in the upward movement of the shuttles 30 in the direction of the arrows as shown in FIG. 4B. In this case, such an upward movement of the shuttles 30 is further enhanced by the elastic plate-shaped members 40A, thereby causing the lace passage sections 20B to be narrowed. In this way, in spite of the force applied to the shoelace 2 so as to
5 loosen it, the shoelace 2 is securely restricted so as not to be loosened.

After completing the tying of the shoelace 2, as shown in FIG. 4C, both free hanging ends of the shoelace 2 are fitted in the gaps 62 so as to be stably fixed by the shoelace holders 60A, respectively.

Then, if the release button 50 is pushed by the wearer as shown in FIG. 4D, the shuttles 30
10 are moved downwardly by overcoming the elasticity of the elastic plate-shaped members 40A. As a result, the shoelace 2 is released from its restricted state to allow it to be loosened and untied if necessary.

As stated above, with the shoelace tying device 1 in accordance with the first embodiment of the present invention, it is possible to tightly tie the shoelace 2 so that it is not inadvertently
15 loosened by simply pulling the shoelace 2 as desired. Further, the shoelace 2 can be simply released from its taut tied state as the release button 50 is pushed by the wearer.

Second Embodiment

Now, another shoelace tying device in accordance with a second embodiment of the
20 present invention will be explained with reference to FIGs. 5 to 8D.

Similarly to the above described first embodiment, the shoelace tying device 1 basically comprises a pair of the left and right lace passages 20, a pair of the left and right shuttles 30, a pair of the left and right elastic members 40, and the release button 50, and all these components are incorporated in the housing 10. However, the first and second embodiments are somewhat
25 different in relation to the sectional shape of the housing 10, the kind of the elastic members 40, the shape of the release button 50, and the structure of the shoelace holder 60. Therefore, in the following description, some parts in this embodiment are substantially the same as those in the first embodiment and thus denoted by the same reference numerals even though they are depicted in different drawings, and a detailed description thereof will thus be omitted because it is considered
30 to be unnecessary.

The housing 10, which has an approximately elliptical sectional shape, also incorporate the inclined protrusions 13 therein so that the inclined protrusions 13 are spaced apart from the

upper and lower walls 11 and 12 by constant distances and are obliquely oriented. Thereby, either space between the upper and lower walls 11 and 12 around the respective inclined protrusions 13 defines the respective lace passages 20.

In this embodiment, similarly, the shoelace 2 enters the passage sections 20A defined
5 between the upper wall 11 and the inclined protrusions 13, then goes round the passage sections 20B between the inclined protrusions 13 and the shuttles 30, and finally comes out of the passage sections 20C between the inclined protrusions 13 and the lower wall 12.

In the first embodiment, the elastic plate-shaped members 40A, integrally formed with the housing 10, are used as the elastic members 40, but the present embodiment uses torsion
10 springs 40B as the elastic members 40. The torsion springs 40B are installed between the respective shuttles 30 and the lower wall 12 of the housing 10, and adapted to push the shuttles 30 upwardly so as to narrow the lace passage sections 20B, respectively. In FIG. 6, the reference numeral 41 denotes posts, around which the torsion springs 40B are fitted, respectively. Throughout a circumference of the respective shuttles 30 in the form of a toothed wheel, preferably,
15 are formed grooves 31, respectively, for preventing the torsion springs 40B from seceding from their positions.

Similarly to the first embodiment, the release button, which is specifically designated as reference numeral 50B in the second embodiment, is also fitted at the center thereof around one end of the partition 15 formed in the housing 10. The release button 50B of the second
20 embodiment has the two operating portions 51 for pressing the two shuttles 30, the button portion 52, and elastic wings 53 formed at both sides of the button portion 52, respectively. With such a configuration, by virtue of the elasticity of the wings 53, the release button 50B can be smoothly returned to its original position at the same time as the removal of a pushing force exerted upon the release button 50B.

In the present embodiment, as the shoelace holders 60 is provided a single shoelace holder 60B. The shoelace holder 60B comprises a pair of connecting rods 63, a ring-shaped holder body 64, and a cap 66. The connecting rods 63 are connected at their one-side ends to the housing 10. The ring-shaped holder body 64 is connected to the other ends of the connecting rods 63, and is formed with a plurality of holes 65 for allowing the shoelace 2 to be threaded
30 therethrough into a bow-shaped knot. One surface of the holder body 64, more particularly, the upper surface thereof is opened for enabling the shoelace 2 to approach the holes 65. The cap 66 is used to cover the opened surface of the holder body 64.

The connecting rods 63 may be configured to be fitted around any projections similar to the holder posts 61 of the first embodiment, and the connecting rods 63 and the holder body 64 may be formed into a single member or may be formed into independent members configured to be assembled to each other.

5 The holes 65 of the holder body 64 include an insertion hole 65A, through which both free ends of the shoelace 2 are inserted together, four side holes 65B spaced apart from both sides of the insertion hole 65A, in pairs, by approximately 90 degrees so as to allow both the ends of the shoelace 2 to be tied into a bow-shaped knot, and a drawing hole 65C formed at an opposite position of the insertion hole 65A, through which both free ends of the shoelace 2 are drawn
10 together.

With such a shoelace holder 60B, both free ends of the shoelace 2, hanging from the device 1, can be smartly tied into a bow-shaped knot.

In the present embodiment, in a state wherein the housing 10 is successively covered by the inner cover 70 and the outer cover 80, a locker, which is designated as reference numeral 72, is
15 used to lock the inner cover 70 to the housing 10, and another locker, which is designated as reference numeral 82, is used to lock the outer cover 80 to the housing 10.

Now, the operation of the shoelace tying device 1 in accordance with the second embodiment will be explained with reference to FIGs. 8A to 8D.

First, as shown in FIG. 8A, as the shoelace 2 is threaded in the lace passages 20, and is
20 tightened by being pulled in the direction of the arrows, the shuttles 30 are slightly moved downwardly as they are forced by the movement of the shoelace 2. In this way, the shoelace 2 is kept in a state allowing free continuous pulling thereof. As shown in FIG. 8B, after completing the tying of the shoelace 2, the shoelace 2 is securely tightened by means of the shuttles 30, so as not to be inadvertently loosened. Then, as shown in FIG. 8C, both free hanging ends of the
25 tightened shoelace 2 are threaded in the shoelace holder 60B so as to be smartly tied into a bow-shaped knot. After that, as the release button 50 is pushed, as shown in FIG. 8D, the shuttles 30 are moved downwardly, thereby allowing the shoelace 2 to be released from its restrained state. In this way, the shoelace 2 is maintained so as to be loosened if necessary.

As apparent from the above description, the present invention provides a shoelace tying
30 device designed to enable a wearer to tighten the shoe to conform closely with the shape of the foot of the wearer, which can allow a shoelace to be easily and rapidly tied and untied when putting on and taking off the shoe. Further, according to the present invention, it is possible to continuously

maintain the shoelace in a taut tied state unless a release button is pushed, thereby being capable of preventing the shoelace from becoming inadvertently loosened and untied. Furthermore, according to the present invention, it is possible to smartly tie both hanging ends of the tightened shoelace into a bow-shaped knot.

- 5 Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.